

# DVT Problems - Handout

	<u>distance</u>	<u>velocity</u>	<u>time</u>
Bus	$40x$	40	$x$
Plane	$600y$	600	$y$
Total	1320	—	5

$$\textcircled{1} 40x + 600y = 1320$$

$$\textcircled{2} [x + y = 5] \times 40$$

$$\begin{array}{r} \textcircled{1} 40x + 600y = 1320 \\ - \quad 40x + 40y = 200 \\ \hline \end{array}$$

$$\frac{560y}{560} = \frac{1120}{560}$$

$$y = 2$$

sub  $y=2$  into  $\textcircled{1}$

$$x + y = 5$$

$$x + 2 = 5$$

$$x = 5 - 2$$

$$x = 3$$

∴ they travelled 2h by plane

	<u>distance</u>	<u>velocity</u>	<u>time</u>
hover land	$x$	40	$\frac{x}{40}$
hover water	$y$	10	$\frac{y}{10}$
total	185	—	5.75

$$\textcircled{1} x + y = 185$$

$$\textcircled{2} \left[ \frac{x}{40} + \frac{y}{10} = 5.75 \right] \times 40$$

$$\textcircled{1} x + y = 185$$

$$- \quad \textcircled{2} x + 4y = 230$$

$$\begin{array}{r} -3y = -45 \\ \hline -3 \quad -3 \end{array}$$

$$y = 15$$

sub  $y=15$  into  $\textcircled{1}$

$$x + y = 185$$

$$x + 15 = 185$$

$$x = 185 - 15$$

$$x = 170$$

∴ the hovercraft travelled 170 km on land & 15 km on water.

③

	<u>distance</u>	<u>velocity</u>	<u>time</u>
Run	$10x$	10	$x$
Walk	$6y$	6	$y$
total	42		1

$$\textcircled{1} \quad x - y = 1$$

$$\textcircled{2} \quad 10x + 6y = 42$$

Isolate ①

$$x = y + 1$$

Sub  $x = y + 1$  into ②

$$10(y + 1) + 6y = 42$$

$$10y + 10 + 6y = 42$$

$$\frac{16y}{16} = \frac{32}{16}$$

$$y = 2$$

Sub  $y = 2$  into ①

$$x - (2) = 1$$

$$x = 1 + 2$$

$$x = 3$$

∴ it took Amy 5h to finish the marathon.

④

	<u>distance</u>	<u>velocity</u>	<u>time</u>
up stream	$x$	4	$\frac{x}{4}$
down stream	$y$	12	$\frac{y}{12}$
total	0		10

$$\textcircled{1} \quad x - y = 0$$

$$\textcircled{2} \quad \left[ \frac{x}{4} + \frac{y}{12} = 10 \right] \times 12$$

$$\textcircled{2} \quad 3x + y = 120$$

$$+ \textcircled{1} \quad x - y = 0$$

$$\frac{4x}{4} = \frac{120}{4}$$

$$x = 30$$

Distance back to start  
= 0

Sub  $x = 30$  into ①

$$x - y = 0$$

$$(30) - y = 0$$

$$y = 30$$

∴ they went 30 km upstream.

	<u>distance</u>	<u>velocity</u>	<u>time</u>
⑤ plane + wind	600	$x+y$	2
plane - wind	600	$x-y$	3
total	600	$\frac{d}{t}$	

$$\textcircled{1} \quad x+y = \frac{600}{2}$$

$$\textcircled{2} \quad x-y = \frac{600}{3}$$

$$\textcircled{1} \quad x+y = 300$$

$$+ \textcircled{2} \quad x-y = 200$$

$$2x = 500$$

$$x = 250$$

Sub  $x=250$  into  $\textcircled{1}$

$$x+y = 300$$

$$250+y = 300$$

$$y = 300-250$$

$$y = 50$$

∴ the speed of the plane is 250 km/h and the wind is 50 km/h.

	<u>distance</u>	<u>velocity</u>	<u>time</u>
⑥ Ship 1	$6x$	$x$	6
Ship 2	$6y$	$y$	6
Total	264	4	6

$$\textcircled{1} \quad 6x+6y = 264$$

$$\textcircled{2} \quad x-y = 4$$

isolate  $\textcircled{2}$

$$x = y+4$$

sub  $\textcircled{2}$  into  $\textcircled{1}$

$$6(y+4) + 6y = 264$$

$$6y + 24 + 6y = 264$$

$$\frac{12y}{12} = \frac{240}{12}$$

$$y = 20$$

sub  $y=20$  into  $\textcircled{2}$

$$x-y = 4$$

$$x-20 = 4$$

$$x = 24$$

∴ ship 1 travels at 24 km/h and ship 2 travels at 20 km/h

⑦

Martin

Lesley

total

<u>distance</u>	<u>velocity</u>	<u>time</u>
$80x$	$80$	$x$
$100(x-2)$	$100$	$x-2$
<div style="border: 1px solid black; width: 60px; height: 15px;"></div>	$-$	$-$

equations equal  
each other [meet]

①  $d = 100(x-2)$

②  $d = 80x$

sub ① into ②

$$100(x-2) = 80x$$

$$100x - 200 = 80x$$

$$100x - 80x = 200$$

$$\frac{20x}{20} = \frac{200}{20}$$

$$x = 10$$

sub  $x=10$  into ②

$$d = 80x$$

$$= 80(10)$$

$$= 800$$

∴ Lesley will pass Martin  
at the 800 km mark.